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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,902	02/28/2007	Alain Ballagny	279101US6PCT	6280

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EXAMINER
MONDT, JOHANNES P

ART UNIT	PAPER NUMBER
3663	

NOTIFICATION DATE	DELIVERY MODE
04/14/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/551,902	BALLAGNY ET AL.	
	Examiner	Art Unit	
	JOHANNES P. MONDT	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 January 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20,21,23-27,29,31,32 and 35-39* is/are pending in the application.

4a) Of the above claim(s) *21,24-26,32,37 and 38* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20,23,27,29,31,35,36 and 39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1 Form PTO-1449*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Another examiner, Johannes Mondt, has assumed full responsibility for the prosecution of the application.

Response to Amendment

2. Amendment filed 01/22/2010 forms the basis for this Office action. In said Amendment applicant filed amendments to the specification, to the claims and to the drawings. Comments on Remarks submitted with said Amendment are included below under "Response to Arguments". The Replacement Sheet to the Drawings and Amendment to the Specification are herewith approved.

Election/Restrictions

3. Applicant is reminded of the Election-of-Species requirement of record, in which species C3 was elected out through election of species C1. Therefore, claim 37 is herewith withdrawn from consideration, as it recites the step of "roller burnishing". See page 4 of the restriction requirement mailed 5/6/2009, and see the election of Species C1 in Applicant's response filed 6/4/2009 (page 1).

Information Disclosure Statement

4. The new examiner herewith acknowledges the consideration of all items listed in the Information Disclosure Statement filed on 02/01/2006. A signed copy of Form PTO-1449 is herewith enclosed.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. The term "high-density" in ***claims 20, 23, 27, 29 and 31*** (see line 1 of claim 20) is a relative term which renders the claim indefinite. The term "high" in “high-density” is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The specification can only be considered to provide examples of what is considered a high density, but not a range. One of ordinary skill in the nuclear art would not know the definite metes and bounds on density of what is considered a high-density nuclear fuel.

6. The terms “stainless” and "ductile" in ***claims 20, 23, 27, 29, 31, 35, 36 and 39*** through line 3 of claim 20 (not counting lined-through lines) and line 7 of claim 35 are relative terms, which renders the claim indefinite. The terms “stainless” and "ductile" are not quantitatively defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. ***Claim 20*** is rejected under 35 U.S.C. 102(b) as anticipated by Hooper et al (US 3,297,544) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hooper et al (US 3,297,544) in view of Glazman et al (US 5, 412,701) while relying on Feinroth (US 5,182,077) for evidence.

N.B.: the rejection is provided subject to the noted indefiniteness under 35 U.S.C. 112, second paragraph, as set forth above in sections 5-6, to the best of examiner's understanding. Two alternative rejections are provided because the absence of standards to ascertain whether a material is "stainless" and "ductile" enough provides reason to ignore these adjectives, - in

which case the claimed invention is anticipated by Hooper et al, while it is shown in the rejection under 35 USC 103(a) that in any case it would have been obvious to one of ordinary skill in the art in view of Glazman, while in that case relying also on establishment of fact as confirmed by Feinroth.

Hooper et al teach a high-density fissile material nuclear fuel 1 (compressed fuel particles 1b of a fuel bearing compound in final form enclosed by fuel cladding 1a: (col. 1, l. 61-70)) comprising:

a stainless ductile casing 2/3/1a ("tubular former" 2 comprising ribs 3 to which cladding material, e.g., Zircaloy, is welded or brazed: col. 1, l. 61 – col. 2, l. 11; the examiner takes the position that said welding or brazing forms a unitary structure comprising 2, 3 and 1a) (Zircaloy is considered ductile in the art: in support of this statement of fact see Feinroth (col. 1, l. 11-22). Zircaloy. Although some Zircaloy compositions are susceptible to corrosion, Zircaloy-2 and -4 are much less so while their selection as cladding material would have been obvious in view of Glazman, who teach as prior art the conventional use of Zircaloy-2 and Zircaloy-4 as cladding material for BWR reactors and PWR reactors, respectively (see col. 1, l. 34-49). Applicant is reminded in this regard that it has been held that mere selection of known materials generally understood to be suitable to make a device, the selection of the particular material being on the basis of suitability for the intended use, would be entirely obvious: see MPEP 2144.07; combination of the teaching by Glazman et al with the invention by Hooper et al is motivated by the long-recognized suitability of Zircaloy-2 and Zircaloy-4, and said combi9nation is straightforward enough to justify high probability of success, considering the time-honored use of Zircaloy-2 and Zircaloy-4 as clad material.

Hooper et al also teach: an assembly formed of a plurality of wires 1b [Examiner Note: the lateral circular cross section of the clad fuel lengths and their apparent bendability (col. 2, l. 11-40) justifies the characterization of the fuel as composed of "wires", see col. 3, l. 6+)stranded, braided or weaved together (see Figures 1 and 2), wherein the assembly is contained inside said casing and compressed therein by said casing (due to the contact between the former 2 and the fuel assembly 1 (see Figures 1-2, fuel being extruded: col. 2, l. 11-40) and more than half of the numbers of wires are constituted by the fissile material (all of said wires 1b are fuel wires).

In the alternative rejection under 35 USC 102(b), both "stainless" and "ductile" are interpreted from the specification, where at face value they do not appear to have any quantification and hence are considered to be met, in which case Glazman is not necessary, nor does Feinroth in said alternative have to be relied upon.

8. ***Claims 20, 23, 27, 29, 31, 35, 36 and 39*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Travelli (US 4,720,370) (made of record by applicant in IDS filed on 2/1/2006) in view of Hooper et al (US 3,297,544), and relying on Walter (US 3,913,481) and Parker et al (US 6,520,123 B2) for evidence.

N.B.: the rejection is provided subject to the noted indefiniteness under 35 U.S.C. 112, second paragraph, as set forth above in sections 4-5, to the best of examiner's understanding.

On claims 20 and 35: Travelli teaches a high-density fissile material nuclear fuel 10 ("fuel containing plate structure", col. 3, l. 38-51) comprising:

a stainless ductile casing 12 (metallic, - in particular aluminum or aluminum alloy, non-fissionable matrix plate member), noting that aluminum is a ductile material, as confirmed by Walter (col. 4, l. 4-5), and also noting that aluminum is stainless as it does not rust, as confirmed by Parker et al (col. 2, l. 8-11);

an assembly formed of a plurality of wires 14 (plurality of continuous elongated wire-like fissionable fuel members; col. 3, l. 47-51),

wherein the assembly is contained inside the stainless ductile casing (12) and compressed therein by said casing (col. 4, l. 56-62) and more than half of the number of wires are constituted by the fissile material (the wires are made of fissionable fuel: col. 3, l. 47+).

Travelli does not teach the limitation that the wires are stranded, braided or waved together.

However, it would have been obvious to include said limitation in view of Hooper et al, who, in a patent on nuclear fuel bearing bodies such as fuel elements for nuclear reactors (col. 1, l. 10-16), hence art analogous to Travelli, teach the fissile material in the form of nuclear fuel bearing compound or mixture 1b and, though the use of former 2 (col. 1, l. 70+; the analog of Travelli's casing) forming said fissile material in the form of elongated wires (circular cross section being one of the embodiments: see col. 3, l. 6+; see also Figures 1-2) and winding the lengths of said wires into a number of convolutions extending about a common axis, e.g., in the form of a multi-start helical winding, and e.g. with successive layers being wound oppositely handed (col. 1, l. 17-47), thus meeting "braided", "plaited", "stranded" and "weaved", for the specific purpose

of ensuring the entire outer surface of the length of the clad material around the fuel wire is available as heat transfer surface when swept by coolant (col. 3, l. 23-31).

Motivation to include the teaching by Hooper et al in the invention by Travelli flows directly from the improved heat transfer capability of the coolant process due to the braiding, plaiting, stranding, weaving of the fuel wires.

Combination of the teaching and the invention is straightforward, Hooper et al specifically pointing out how the braiding, stranding, plaiting, weaving can be accomplished with high expectation of success.

Regarding claim 35, in said combination the nuclear fuel is produced by a method comprising: producing wires 14 more than half (in fact: all) being wires of fissile material; producing at least one assembly by stranding, braiding, or weaving said wires together ("together" interpreted as "closely and approximately parallel"); disposing the assembly in a stainless, ductile casing (casing 12 modified by the teaching of Hooper et al with former 2 as example); and deforming the stainless ductile casing with the assembly disposed therein so that the stainless, ductile casing compresses the wires (col. 4, l. 56-62).

On claim 23: the fissile material in Travelli is selected from uranium alloys (especially malleable uranium alloys, with as specific examples: U3Si, U3Ga, U3Ge (hence alloys of uranium): col. 3, l. 52- col. 4, l. 3).

On claim 27: all the wires of the assembly 14 are constituted of the fissile material, being all defined as fissionable fuel members 14 (col. 3, l. 48).

On claim 29: the wire dimensions are all defined precisely for the wires (col. 4, l. 21-31).

On claim 31: the assembly of wires is a braid form (col. 1, l. 17-47; see also Figures 1 and 2).

On claim 36: the stainless ductile casing topologically is in the same class as a tube (see the combination of Figures 1 and 3). The specific shape of the casing in Hooper is a tube 2 (Hooper et al., col. 1, l. 71); applicant is also reminded that it has been held that a shape capable of performing the claimed function constitutes a case of *prima facie* anticipation. In re Schreiber, 128 F.3d at 1478, 44 USPQ2d at 1432. Furthermore, the casing comprises only one assembly (Figure 1), and the deforming includes drawing the stainless ductile casing by rolling (col. 2, l. 21-30 and col. 3, l. 59+).

On claim 39: the deforming is performed so that a cross-section shape of the wires is distorted from their original cross-section shape (inherent in the extrusion process: see col. 4, l. 63+), and such that the cross-sections of two adjacent wires fit together (interpreted to mean that they can be close together in approximate parallel alignment: see Figures 1-2 in Hooper et al., which, though the combination as defined above is the relevant reference).

Response to Arguments

9. Applicant's arguments with respect to claims 20, 23, 27, 29, 31, 35, 36 and 39 as substantially amended have been considered but are moot in view of the new ground(s) of rejection resulting from a search necessitated by substantial amendment. The new

examiner agrees with the characterization of Seo et al as failing to qualify as prior art for the reasons argued by applicant in Remarks.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHANNES P. MONDT whose telephone number is (571)272-1919. The examiner can normally be reached on 8:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JOHANNES P MONDT/
Primary Examiner, Art Unit 3663